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(56) Documents Cited
GB 2172059 A US 5653363 A US 5501374 A
US 5192008 A US 4356938 A

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(54) Abstract Title
Caulking gun with pressure-relief device for drip-free operation

(57) A caulking gun having a cam 12c formed on its trigger 12, to act on the locking plate 15 at an intermediate point during the return movement of the trigger, to release the locking engagement of the locking plate 15 on the push rod 11. In this position of the trigger, therefore, the pressure of caulking material within the cartridge acts to displace the push rod 11 rearwardly, so relieving this pressure and stopping the unwanted flow of material from the cartridge nozzle.

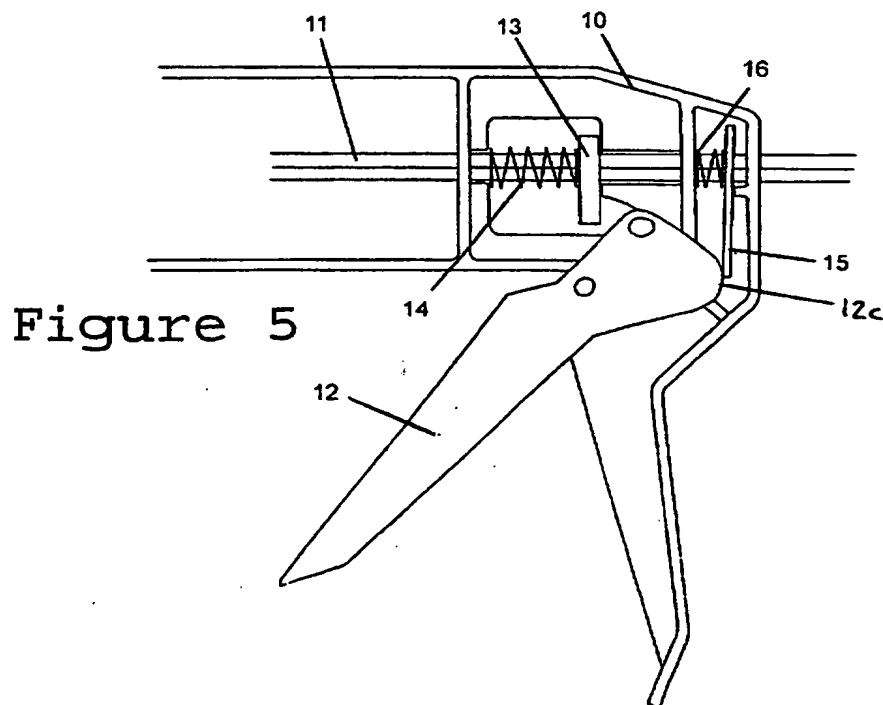


Figure 5

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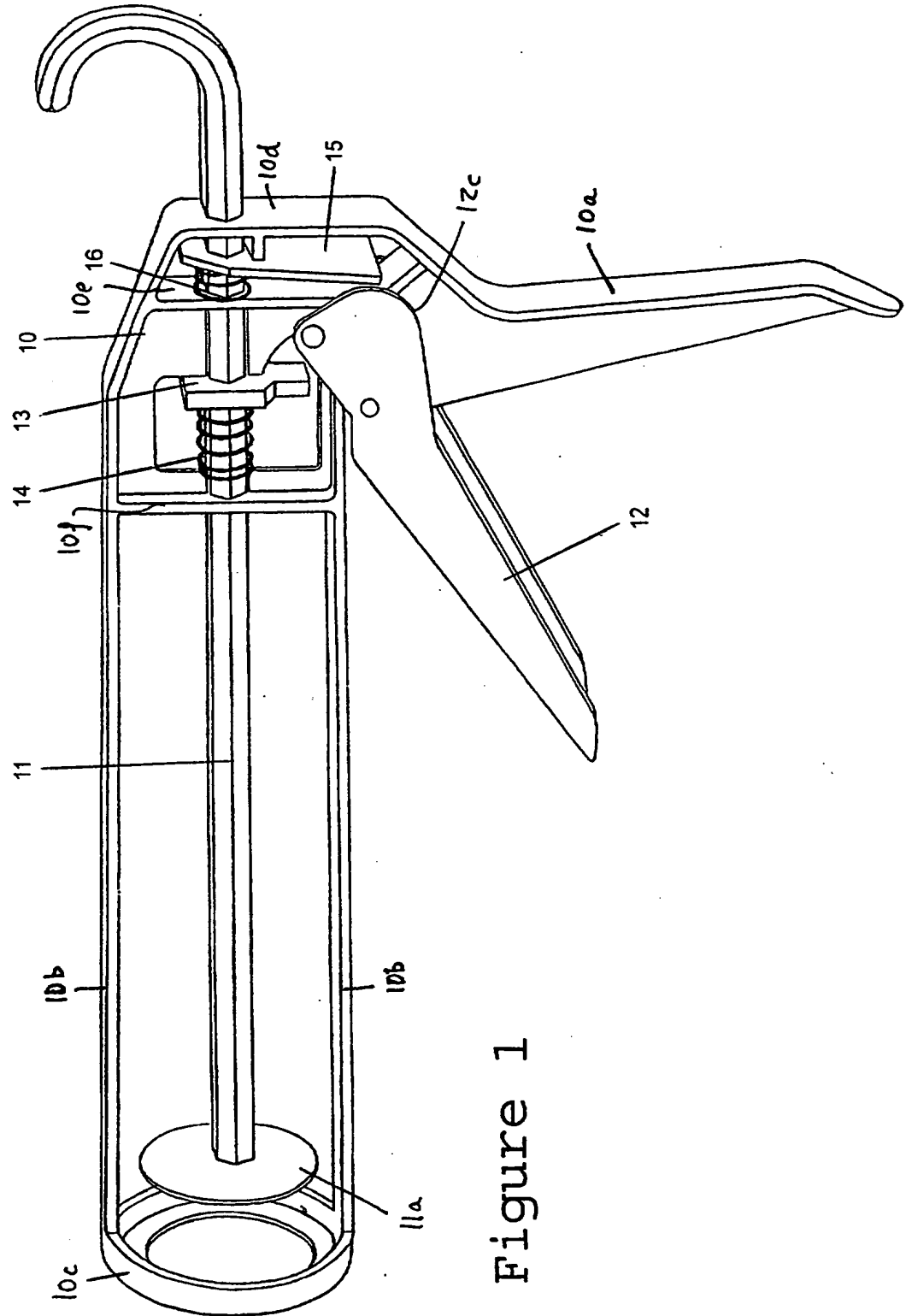


Figure 1

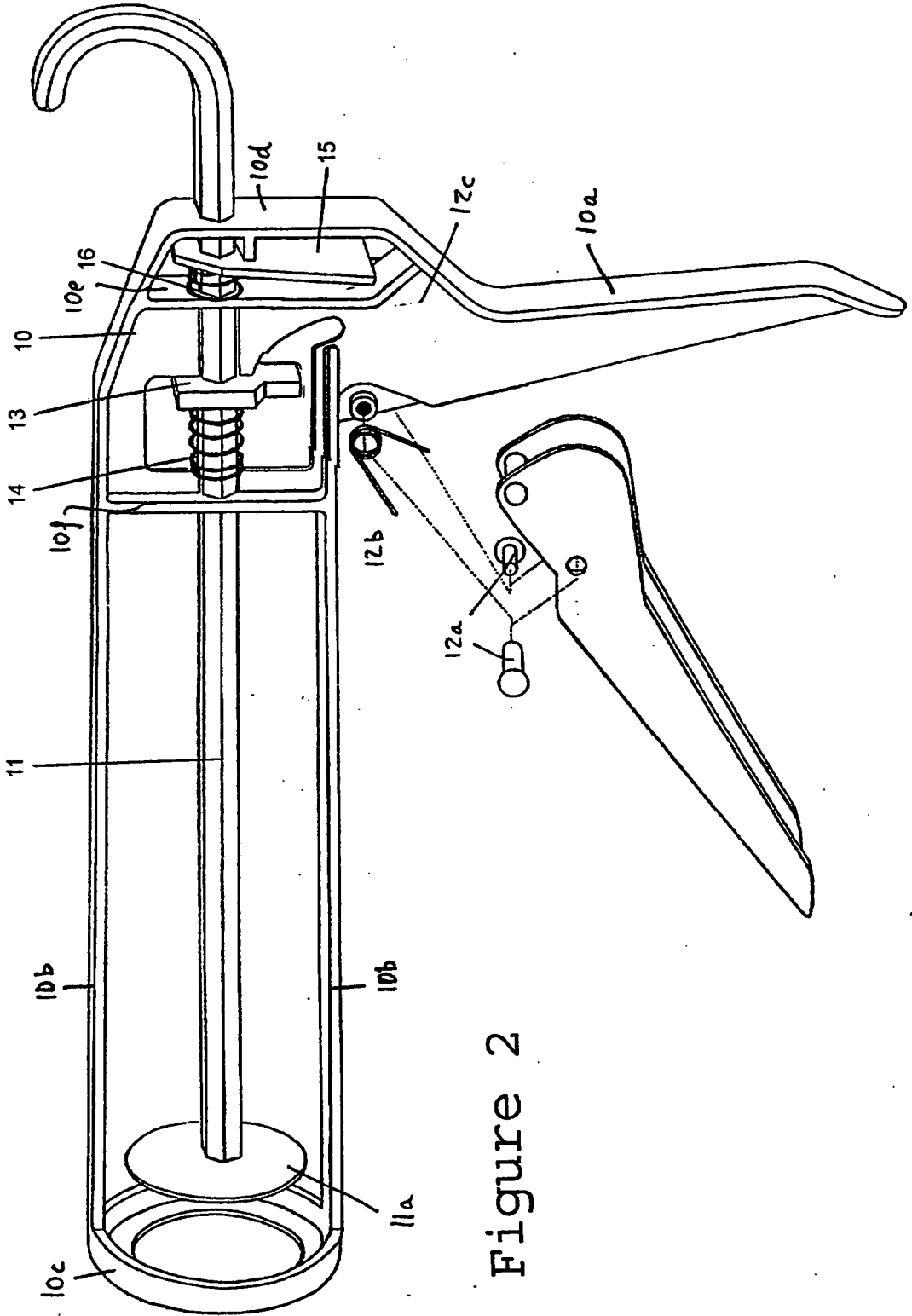


Figure 2

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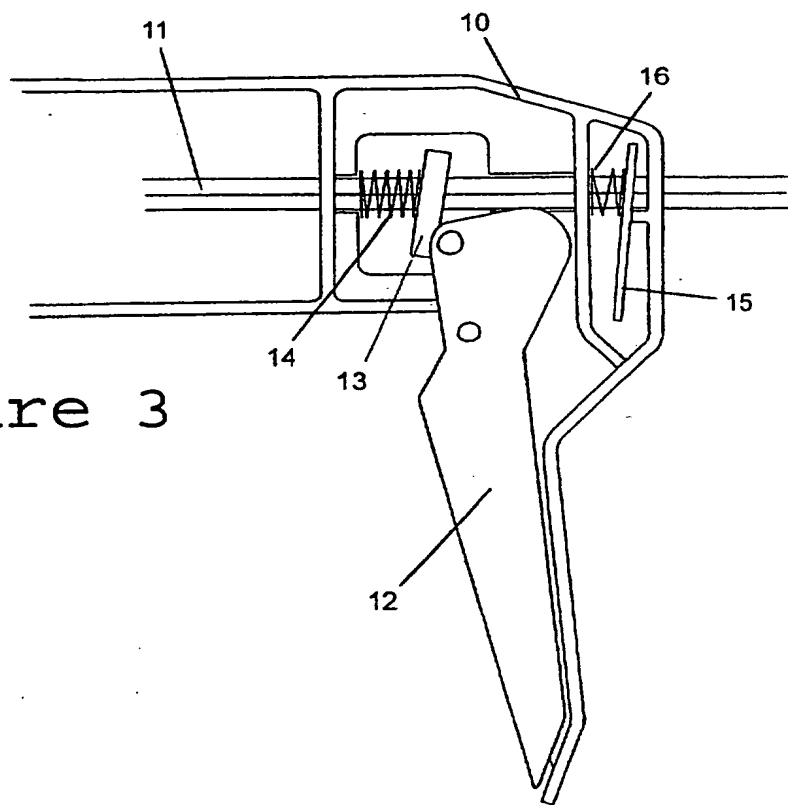


Figure 3

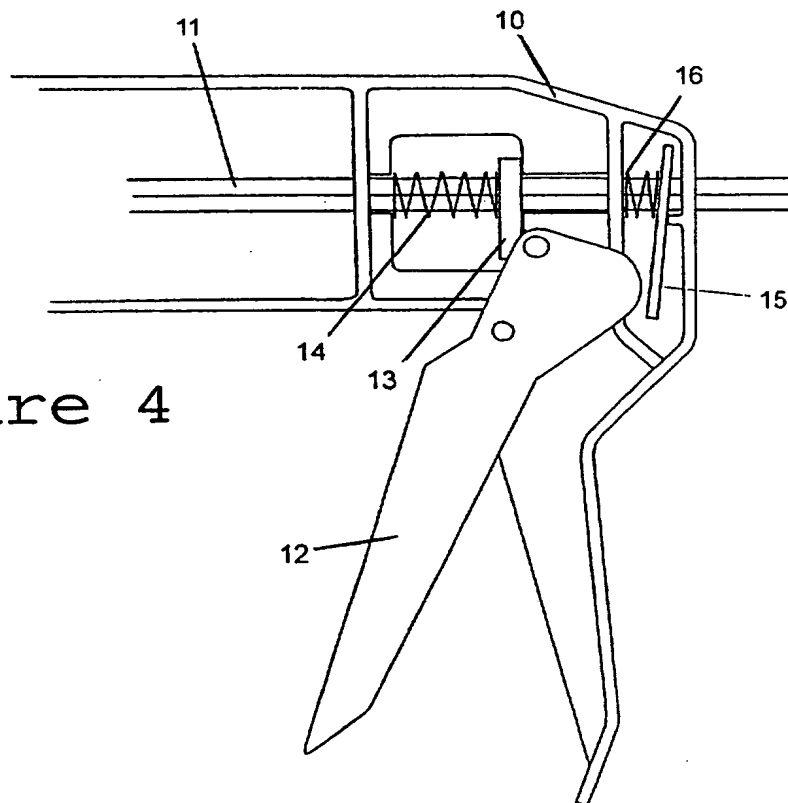
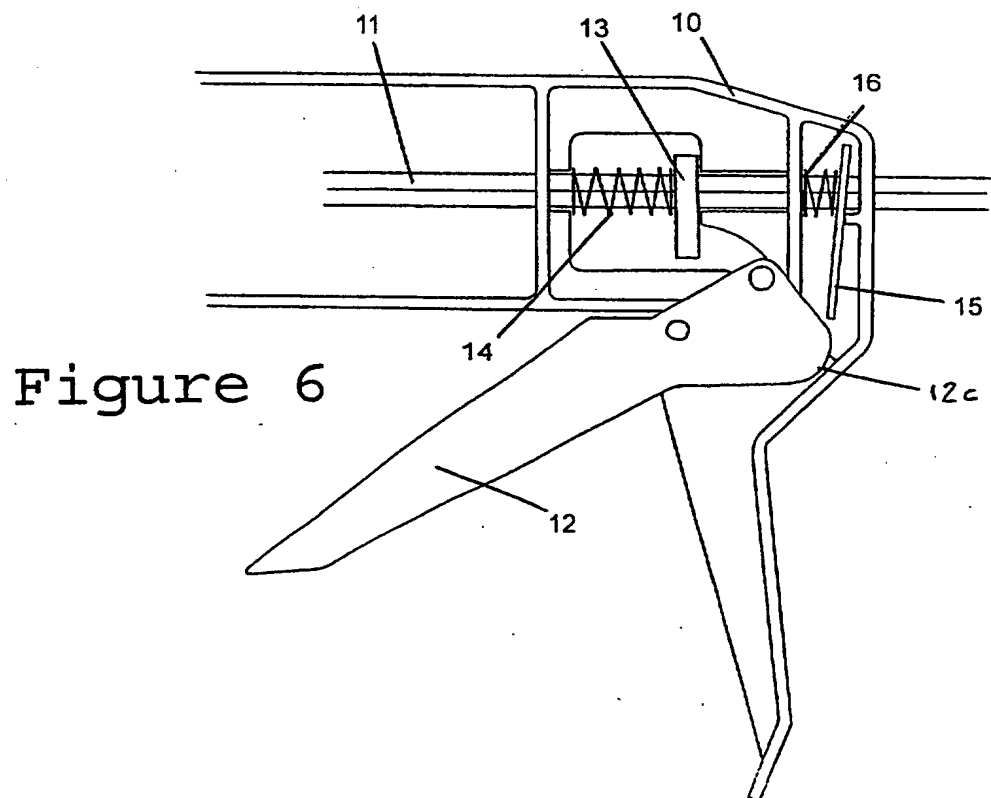
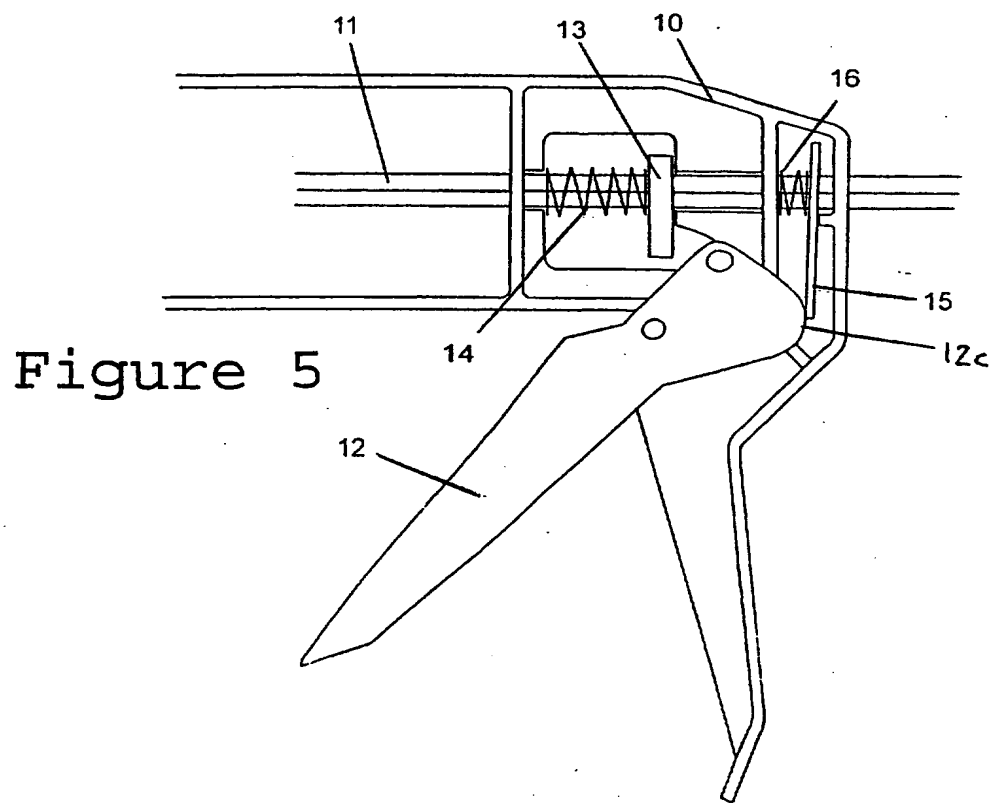


Figure 4



Caulking Gun

This invention relates to a caulking gun and particularly to a caulking gun which may be used in a drip-free manner.

Caulking guns are well known tools used to extrude
5 caulks, sealants, adhesives and other fluid material from a tubular cartridge, through a nozzle at one end of the cartridge, in order to apply the material to a surface.

Typically such a caulking gun is operated via a trigger which acts as a lever and works on a push rod in such a way
10 that it causes the push rod to move forward against the longitudinally moveable base of the tubular cartridge. This action causes pressurisation of the material within the cartridge, causing it to flow through the nozzle at the opposite end of the cartridge.

15 As the trigger is released from acting on the push rod, the push rod is prevented from withdrawing. This is due to the action of a spring-operated locking plate which acts on the push rod to allow the rod to travel in a forward direction only. This results in a certain amount of pressure being
20 maintained within the cartridge, and therefore flow of material from the nozzle, between successive operations of the trigger, and allows for a reasonably smooth, continuous flow of material.

In order to stop the flow of material, other than by
25 simply allowing the pressure and flow of material to reduce gradually, it is necessary to release the trigger and press on the above-mentioned locking plate, against the action of its spring, to stop the locking action of the locking plate on the push rod. This allows the push rod to travel backwards,
30 releasing pressure from within the cartridge, and thereby stopping the flow of material.

Stopping the flow of material in this way is not easily

controllable or instantaneous and can result in an untidy application of the material to the desired surface.

An object of this invention is to provide a caulking gun which combines a smooth continuous flow of material during
5 repeated operations of the trigger with the facility to instantaneously and controllably stop the flow when required.

According to the present invention there is provided a caulking gun which comprises a body, a push rod passing through the body, a spring-operated locking plate which acts on the
10 push rod normally to allow travel in only a forward direction, and a trigger which, when operated, acts on the push rod to move it forward, the trigger and locking plate being arranged such that, at a point during the return movement of the trigger, a cam which forms a part of the trigger acts on the
15 locking plate to release its lock on the push rod.

Preferably the trigger is able to move to a point, further in its return movement, where it disengages from the locking plate again, so that the locking plate acts to hold the push rod against further return movement.

20 Thus, after operating the trigger one or more times to pressurise the material within the cartridge and so cause a flow of the material from the nozzle of the cartridge, the trigger may undergo a return movement to the point at which its cam acts on the locking plate to disengage the locking plate
25 fro the push rod. The pressure within the cartridge acts on the push rod to force it rearwardly, so releasing the pressure within the cartridge and stopping the flow of material from the cartridge nozzle.

An embodiment of the invention will now be described by
30 way of example only and with reference to the accompanying drawings, in which:-

FIGURE 1 is a perspective view of a caulking gun in accordance with the invention;

FIGURE 2 is a similar view of the caulking gun, showing the trigger disassembled from the gun;

FIGURE 3 is a view of the handle-end of the caulking gun, shown once the trigger has been fully depressed;

5 FIGURE 4 is a similar view to Figure 3, showing the trigger released to a point from where it may be depressed again without the plunger rod having been allowed to move backwards;

FIGURE 5 is a similar view to Figure 4, showing the
10 trigger released to a point where it disengages the locking plate to allow the push rod to move backwards; and

FIGURE 6 is a similar view to Figure 5, showing the trigger released to its full extent to allow the locking plate to act on the push rod to hold the cartridge secure.

15 Referring to Figures 1 and 2 of the of the drawings, there is shown a caulking gun which comprises a body 10 in which a push rod 11 is mounted, and a trigger 12 which is operable for moving the push rod 11 forwards. The body 10 comprises an open frame structure having a handle 10a
20 projecting downwardly from a rear end portion of the body, and two legs 10b extending longitudinally forwards from the rear end portion, to support a ring 10c at the front end of the gun. The push rod 11 passes through successive mounting sections 10d, 10e, 10f of the rear end portion of the body 10 and has
25 a disc-shaped head 11a fixed to its forward end. The push rod 11 carries a drive plate 13 which is urged rearwardly by a coil spring 14 disposed around the push rod 11 and acting between the mounting section 10f and the drive plate 13. The push rod 11 also carries a locking plate 15 which is urged rearwardly,
30 against the mounting section 10d, by a coil spring 16 which is disposed around the push rod and acts between the mounting section 10e and the locking plate 15. The trigger 12 is pivotally mounted to the handle 10a by means of a co-operating

pair of pivot pins 12a inserted through the trigger 12, at a point inset from its upper end, and through the handle 10a, at a point adjacent the junction of the handle with the rear end portion of the body 10. A bias spring 12b is disposed around
5 the pivot pin and acts between the trigger 12 and the handle 10a.

In conventional manner, the cartridge is placed in the space between the legs 10b of the body 10 (once the push rod has been retracted), with the nozzle of the cartridge
10 projecting through the ring 10c at the forward end of the gun and the forward end of the cartridge located in the recessed rear side of the ring 10c. The push rod 11 is then advanced for its head 11a to enter the rear end of the cartridge and abut the longitudinally-moveable base of the cartridge.

15 Then in order to operate the gun, the user holds the handle 10a with one hand and, with the forefinger of that hand, depresses the trigger 12 against the bias of its spring 12b: the trigger 12 may be depressed fully, to the position shown in Figure 3. In so doing, the front, upper end of the trigger
20 12 bears on the lower end of the drive plate 13, so tilting the drive plate 13 as shown so that it frictionally engages the push rod 11: the pivoting movement of the trigger 12 accordingly causes the drive plate 13 to move the push rod 11 forwardly, so pressurising the material in the cartridge and
25 causing a quantity of this material to be extruded from the nozzle. The trigger 12 is then allowed to return to a position no further than that shown in Figure 4, before being depressed again to extrude further material from the nozzle of the cartridge.

30 During movement of the trigger 12 between the position shown in Figure 3 and the position shown in Figure 4, the locking plate 15 acts on the push rod 11 at all times to allow its forward movement only, thereby maintaining flow pressure

throughout repeated operations of the trigger. In particular, the pressure within the cartridge, providing a rearward force on the push rod, is resisted by frictional engagement between the push rod and the locking plate 15, as a result of the locking plate being tilted, over a fulcrum 15b, by its spring 15a.

To instantly stop the flow of material from the nozzle, the trigger 12 is allowed to travel back, under the influence of its return spring, to its full extent. During the course of this extra movement, the trigger momentarily passes through a position shown in Figure 5. At this position, a cam 12c formed by the rear upper end of the trigger 12, acts on the locking plate 15 in such a way that it progressively straightens it and so releases the locking plate 15 from acting on the push rod 11. This action allows the push rod to travel backwards under the pressure in the cartridge, thus releasing pressure from within the cartridge and instantaneously stopping flow from its nozzle.

As the trigger 12 then continuous past the position shown in Figure 5, the action of the cam part of the trigger allows the locking plate 15 once again to be tilted and so act on the push rod as shown in Figure 6, in order that the cartridge is held securely in position.

With the trigger 12 held in the position shown in Figure 5, the push rod 11 may be grasped at its rear end and then withdrawn or moved forward to enable the cartridge to be loaded or unloaded as required.

It will be appreciated that the caulking gun which has been described can be operated to extrude a quantity of material from the cartridge, then the trigger allowed to return to an intermediate position (Figure 5) to allow release of the pressure within the cartridge: the flow of material is thus stopped, such that the cartridge is drip-free. Then the

trigger is allowed to return to its rest position (Figure 6), in which the push rod is locked in position.

CLAIMS

- 1) A caulking gun which comprises a body, a push rod passing through the body, a spring-operated locking plate which acts on the push rod normally to travel in only a forward direction, and a trigger which, when operated, acts on the push rod to move it forward, the trigger and locking plate being arranged such that, at a point during the return movement of the trigger, a cam which forms a part of the trigger acts on the locking plate to release its lock on the push rod.
- 10 2) A caulking gun as claimed in Claim 1, in which said trigger is able to move to a point, further in its return movement, where it disengages from the locking plate again, so that the locking plate acts to hold the push rod against further return movement.
- 15 3) A caulking gun substantially as herein described with reference to the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0101063.6
Claims searched: 1

Examiner: Robert Crowshaw
Date of search: 10 April 2001

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.S): F1R
Int Cl (Ed.7): B05C 17/01
Other: Online databases: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2172059 A (CREED) Note in figure 1 the clutch plate 16 which is released by the screw 15 on the lever 6 during forward movement of the lever.	1, 2
X	US 5653363 (CHANG) Note in the figures the grip 150 which is contacted by the top portion of trigger 90 as the trigger is fully released, disengaging grip 20 from the plunger shaft 160 to prevent drips.	
A	US 5501374 (VITAL PRODUCTS) Note in the figures the pressure relief mechanism in which arm 30 on the trigger 12 disengages dog 34 from teeth 28 on push rod 26 during forward movement of the lever.	
X	US 5192008 (DAI SHYUN) Note in figure 5 the trigger 8 which contacts the stopper plate 4 on its return stroke to release the lock on the push rod 1.	1
X	US 4356938 (KAYSER) Note in figure 6 the mechanism in which a cam 60 on the trigger 26 allows sprung pawl 50 to retreat as the trigger 26 is released.	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.